

Hycar® 2671

Acrylic Emulsion

Lubrizol

General Description:

Product Number	-	Hycar® 2671 emulsion
Product Type	-	Acrylic
Emulsifier	-	Synthetic Anionic
Density: Latex (lbs./gal.)	-	8.9
Density: Solids (lbs./gal.)	-	4.5

Typical Properties:

pH	-	5.1
Total Solids (%)	-	53.5
Brookfield Viscosity (centipoises)		
Spindle No. 2, 60 rpm	-	170
Surface Tension (dynes/cm)	-	38
Specific Gravity: Latex	-	1.07
Glass Transition Temperature (°C)	-	-11

Stability:

Good chemical and mechanical stability

Outstanding Properties:

Heat reactive . . . anti-skinning . . . good heat and light stability . . . soft hand

Suggested Applications:

Upholstery backcoatings . . . flock adhesives . . . nonwoven binders . . . paper saturation . . . pigment binding . . . beater-addition . . . leather finishes

FDA Status:

Many of our polymers have FDA clearance. However, regulations for clearance are very specific to end use. Please call Lubrizol Technical Service at 1-800-380-5397 for more details.

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Lubrizol Advanced Materials, Inc.
9911 Brecksville Road
Cleveland, OH 44141-3247
800-380-5397
www.lubrizolcoatings.com

Chemical Stability

1. Minimum concentration in aqueous solution to coagulate one drop of latex

Sodium Chloride (%)	10.0
Sulfuric Acid (%)	1.0
Alum (%)	0.1
Methanol (%)	100.0

2. 1 ml. of electrolyte added to 50 ml. of latex

10% NaCl	Stable
1% NaCl	Stable
0.1% NaCl	Stable
10% CaCl ₂	Stable
1% CaCl ₂	Stable
0.1% CaCl ₂	Stable
10% Al (NO ₃) ₃	Unstable
1% Al (NO ₃) ₃	Unstable
0.1% Al (NO ₃) ₃	Stable

Foaming Characteristics

1. Volume of 235 ml. latex after a 5-minute cycle in a Hobart Mixer, #2 speed (ml.). 2200
2. 500 ml. of latex whipped for 5 minutes in a Hobart Mixer

After Standing

5 minutes	2870
10 minutes	2860

Skinning Characteristics

Skin began to form in: 28 min

Effect of 5% Solutions of Thickeners and Viscosity Stability - 1 phr
(LVF Brookfield - 60 rpm except where noted)

Alcogum AN-10	<u>2671</u>
Initial	3460
2 days	3360
1 week	3310
2 weeks	3460
3 weeks	3300
4 weeks	3900

		<u>2671</u>
CMC	Initial	2970
	2 days	2960
	1 week	2860
	2 weeks	2850
	3 weeks	2800
	4 weeks	3460
Carbopol® 934 resin - Brookfield RVF 20 - rpm	Initial	25800
	2 days	24200
	1 week	29000
	2 weeks	26000
	3 weeks	26900
	4 weeks	27200
ASE-60	Initial	3620
	2 days	3640
	1 week	3540
	2 weeks	3350
	3 weeks	3300
	4 weeks	3900
Good-Rite® K-718 Polymer	Initial	1560
	2 days	1660
	1 week	1620
	2 weeks	1580
	3 weeks	1650
	4 weeks	1850

Film Properties

Minimum Film-Forming Temperature R.T.

Water Spotting - time to turn film opaque with 1 drop of water

Dried 24 hrs. at R.T.	6'
Dried 24 hrs. at R.T. + 2 hrs. at 220°F Cure	35'
Dried 24 hrs. at R.T. + 15 min. at 275°F Cure	40'
Dried 24 hrs. at R.T. + 10 min. at 300°F Cure	40'
Dried 24 hrs. at R.T. + 10 min. at 325°F Cure	43'

Water Swell - 1" X 2" sample immersed 10' in H₂O - % area increase

Dried 24 hrs. at R.T.	7.6
Dried 24 hrs. at R.T. + 2 hrs. at 220°F Cure	10.1
Dried 24 hrs. at R.T. + 15 min. at 275°F Cure	7.6
Dried 24 hrs. at R.T. + 10 min. at 300°F Cure	17.9
Dried 24 hrs. at R.T. + 10 min. at 325°F Cure	17.9

Redispersibility - hand rub with water for 2 minutes - uncured films

Initial (film just dry)	Very Little
After 1 hour	Very Little
24 Hours	None

Stress-Strain Data on Unsupported Films

R.T. Films

Ultimate tensile strength (psi)	259
Ultimate elongation (%)	2035
Modulus at 100% elongation (psi)	40
Modulus at 300% elongation (psi)	67
Modulus at 500% elongation (psi)	96
Modulus at 1000% elongation (psi)	209
Modulus at 1500% elongation (psi)	244
Modulus at 2000% elongation (psi)	165

Films Cured 10 Minutes at 150°F

Maximum tensile strength (psi)	274
Ultimate elongation (%)	1800
Modulus at 100% elongation (psi)	49
Modulus at 300% elongation (psi)	70
Modulus at 500% elongation (psi)	94
Modulus at 1000% elongation (psi)	205
Modulus at 1500% elongation (psi)	261

Films Cured 10 Minutes at 225°F

Ultimate tensile strength (psi)	370
Ultimate elongation (%)	973
Modulus at 100% elongation (psi)	46
Modulus at 300% elongation (psi)	73
Modulus at 500% elongation (psi)	111

Films Cured 10 Minutes at 300°F

Ultimate tensile strength (psi)	411
Ultimate elongation (%)	510
Modulus at 100% elongation (psi)	46
Modulus at 300% elongation (psi)	119
Modulus at 500% elongation (psi)	381

Graves Tear (lbs./in.)

R.T. Films	36.5
10 minutes at 150°F cure	39.0
10 minutes at 225°F cure	34.0
10 minutes at 300°F cure	31.0

Graves Tear (lbs./in.)

R.T. Films	34
10 minutes at 150°F cure	34
10 minutes at 225°F cure	34
10 minutes at 300°F cure	35

Heat Stability - Photo-Volt Reflectance Readings of R.T. Films aged at 300°F. (Standard 79.0)

Initial	75.5
After 10 minutes	68.5
After 20 minutes	66.0
After 30 minutes	61.0
After 40 minutes	58.5
After 50 minutes	54.0
After 60 minutes	48.0

Light Stability - Photo-Volt Reflectance Readings of Fadeometer aged at R.T. Films (Standard 79.0)

Initial	75.0
20 SFH	74.5
40 SFH	74.0
60 SFH	73.5
80 SFH	76.5
100 SFH	78.5

Chemical Resistance of 300°F Cured Films - % Increase in Area after 10 minutes immersion

Perchloroethylene	66.0
10% H ₂ SO ₄	7.0
10% NaOH	6.0
ASTM Fuel A	7.6
ASTM Fuel B	37.0
Acetone	424.0
Water	17.9
Good-Rite® GP-261	3.0
Good-Rite® GP-233	7.0
Santicizer 141	15.0
Paraplex® G-62	4.0
ASTM Oil #1	5.0
ASTM Oil #3	10.0

Physical Properties of Super Zero Seal Paper Coated with 2 Layers of each Latex and Dried at 212°F.

MVT - grams/100 sq in. per 24 hours 70.5

Blocking - 1" X 1" samples, face to face and face to back, under a 2 lb. weight for 16 hours at 120°F.

Face to Face	1
Face to Back	2

- 0 - no sealing
- 1 - sealed but pulled apart without destroying coating
- 2 - sealed but required more force to pull apart
- 3 - fused or sealed

Wicking - aged in 140°F oven - corn oil and turpentine penetration

Aged for 30 minutes	None
Aged for 60 minutes	None
Aged for 90 minutes	None
Aged for 120 minutes	None
Aged for 150 minutes	None
Aged for 180 minutes	None
Aged for 24 hours	None

Paper Saturation

(1) 6 mil crep

Pickup (%)	71.3
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Physical Properties

3 Minutes at 212°F Cure

Dry tensile (lbs./in.)	24.8
Dry elongation (%)	24.6
Wet tensile (lbs./in.)	2.7
Edge Tear (lbs./in.)	12.2
Internal Bond (oz./in.)	53.6

3 Minutes at 325°F Cure

Dry tensile (lbs./in.)	23.7
Dry elongation (%)	21.2
Wet tensile (lbs./in.)	16.6
Edge Tear (lbs./in.)	10.7
Internal bond (oz./in.)	70.1

Galvanic Size - Time to rewet (seconds)

R.T. dried	29
3 minutes at 212°F	39
3 minutes at 325°F	499

Cobb Size - TAPPI 441M-60 Grams of water absorbed/sq. meter in 120 seconds

R.T. dried	62.2
3 minutes at 212°F	54.8
3 minutes at 325°F	16.7

(2) 11 mil flat

Pickup (%)	46.8
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Physical Properties

3 Minutes at 212°F Cure

Dry tensile (lbs./in.)	43.7
Dry elongation (%)	7.6
Wet tensile (lbs./in.)	5.5
Edge Tear (lbs./in.)	15.4
Internal Bond (oz./in.)	19.7

3 Minutes at 325°F Cure

Dry tensile (lbs./in.)	48.0
Dry elongation (%)	6.0
Wet tensile (lbs./in.)	32.0
Edge Tear (lbs./in.)	7.9
Internal Bond (oz./in.)	20.8

Galvanic Size - Time to rewet (seconds)

R.T. dried	10
3 minutes at 212°F	10
3 minutes at 325°F	52

Cobb Size - TAPPI 441M-60 Grams of water absorbed/sq. meter in 120 seconds

R.T. dried	249
3 minutes at 212°F	239
3 minutes at 325°F	181

Curability as Indicated by Development of Physical Properties

10 Minutes at 150°F

Dry tensile (lbs./in.)	41.9
Dry elongation (%)	7.0
Wet tensile (lbs./in.)	1.8
Solvent (Perchloroethylene) tensile (lbs./in.)	10.7

5 Minutes at 225°F

Dry tensile (lbs./in.)	48.0
Dry elongation (%)	8.0
Wet tensile (lbs./in.)	8.0
Solvent (Perchloroethylene) tensile (lbs./in.)	15.5

5 Minutes at 280°F

Dry tensile (lbs./in.)	48.5
Dry elongation (%)	6.0
Wet tensile (lbs./in.)	24.0
Solvent (Perchloroethylene) tensile (lbs./in.)	25.5

Nonwoven Binder Evaluation

% Pickup	42.5
Dry tensile (lbs./in.)	40.9
Wet tensile (lbs./in.)	19.9
Elongation (%)	8.0
Solvent tensile (lbs./in.)	15.7

Heat Aging – 225°F

	<u>Original</u>	<u>Washed</u>	<u>Drycleaned</u>
<u>Photo-Volt Reflectance Readings</u>			
0 hours	81.5	81.0	79.0
2 hours	78.5	79.0	77.0
8 hours	76.5	78.0	75.0
16 hours	74.0	76.0	73.0
24 hours	76.5	77.5	76.0

Fadeometer

20 SFH	79.5	80.5	78.5
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Flock Adhesive Evaluation

Drycleaning - Standard Procedure
Hycar® 2671 Emulsion

Rating
1

Wash Fastness

Hycar 2671 emulsion	2
1 - no loss of flock	2 - slight loss of flock

Low Temperature Drape Test - Federal Specification CCC-T-191B, Method 5206Inches of Specimen Required to Pass Through a 43° Angle

R.T.	2.1
60°F	2.2
60°F	2.5
40°F	2.7
30°F	3.1
20°F	4.4
10°F	5.2
0°F	8.5
-10°F	9.0

Crockmeter - Wet Perchloroethylene AbrasionCycles to Slight Wear

Hycar® 2671 Emulsion

200

Recommended Defoamers:

(Lubrizol) Carboflow® DF-130 or Carboflow® DF-135

(BASF Wyandotte) Plurofac RA-40

(Drew chemical) L-474 or Y-166

(Colloids, Inc.) 640* or 681F*

(Nalco) 2300* or 123

(Cognis Corporation) Foamaster® B* or R

(Witco) 780 or 913

(Dow Corning) DB-31* or EK-2*

* Defoamer contains silicone

Defoamers should be reduced to 5-10% concentrations before using. For best results the defoamer solution should be sprayed onto the foam at 0.1 - 0.5 parts based on polymer weight.